

Listing of Claims:

1. (Currently amended) A light-emitting diode chip having an epitaxial semiconductor layer sequence with an active zone that emits electromagnetic radiation and an electrical contact structure comprising:

a radiation-transmissive electrical current expansion layer, which contains ZnO[[],]; and

an electrical connection layer[[],];

wherein the current expansion layer is applied on a cladding layer of the semiconductor layer and comprises a window, in which the connection layer is applied on [[a]] said cladding layer of the semiconductor layer sequence;

the connection layer is electrically conductively connected to the current expansion layer; and

~~the~~ wherein a junction between the connection layer and the cladding layer, during ~~the~~ operation of the light-emitting diode chip, is not electrically conductive or is only so poorly electrically conductive such that ~~the~~ an entire, or virtually the entire, current from the connection layer flows via the current expansion layer into the semiconductor layer sequence.

2. (Original) The light-emitting diode chip according to claim 1,

wherein

the connection layer comprises a metal and the junction between the connection layer and the cladding layer comprises an electrical potential barrier.

3. (Currently amended) The light-emitting diode chip according to claim 1,

wherein

~~the~~ a sheet resistance of intermediate layers of the semiconductor layer sequence between the active zone and the electrical contact structure is ~~in each case~~ greater than or equal to 200 Ω/sq .

4. (Currently amended) The light-emitting diode chip according to claim 1,

wherein

the current expansion layer comprises a sheet resistance of less than or equal to $190 \Omega/\text{sq}$; preferably of less than or equal to $30 \Omega/\text{sq}$.

5. (Currently amended) The light-emitting diode chip according to claim 1, wherein

the connection layer extends beyond the window on ~~that a~~ a side of the current expansion layer which is remote from the semiconductor layer sequence and is applied to ~~the a~~ a front-side surface of the current expansion layer ~~in such a way that it so as to partly covers~~ cover the ~~latter~~ current expansion layer and so that the junction between the connection layer and the current expansion layer is electrically conductive in this region.

6. (Original) The light-emitting diode chip according to claim 1, wherein

the semiconductor layer sequence is based on $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{P}$, $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{As}$, $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$ or $\text{In}_x\text{Ga}_y\text{As}_{1-x-y}\text{P}$, where $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x + y \leq 1$.

7. (Currently amended) The light-emitting diode chip according to claim 1, wherein

the cladding layer comprises $\text{Al}_x\text{Ga}_{1-x}\text{As}_y\text{P}_{1-y}$, where $0 \leq x \leq 1$, and $0 \leq y \leq 1$ ~~[[,]] preferably where $0.1 \leq x \leq 0.5$ and $y = 1$ or where $x = 0$ and $y = 0$.~~

8. (Currently amended) The light-emitting diode chip according to claim 7, wherein

the cladding layer is p-doped ~~[[,]]~~ with at least one of a ~~the~~ dopant Zn ~~and/or~~ and C.

9. (Currently amended) The light-emitting diode chip according to claim 1, wherein

the cladding layer is doped with a dopant concentration of between about $5 \cdot 10^{17}$ and about $5 \cdot 10^{19}$, ~~in particular between about $1 \cdot 10^{18}$ and about $1 \cdot 10^{19}$, the limits being included in each case.~~

10. (Original) The light-emitting diode chip according to claim 1,
wherein
the current expansion layer comprises Al.

11. (Currently amended) The light-emitting diode chip according to claim 10,
wherein
the ~~a~~ proportion of Al in the current expansion layer ~~lies~~ is in a range of between 0% and 10% inclusive, ~~preferably between 1% inclusive and 3% inclusive.~~

12. (Currently amended) The light-emitting diode chip according to claim 1,
wherein
the current expansion layer has a thickness of between 100 and 600 nm, inclusive in ~~particular between 450 and 550 nm, the limits being included in each case.~~

13. (Currently amended) The light-emitting diode chip according to claim 1,
wherein
the current expansion layer has a thickness corresponding to about a quarter of ~~the a~~ wavelength of a radiation emitted by the light-emitting diode chip.

14. (Currently amended) The light-emitting diode chip according to claim 1,
wherein
the current expansion layer is provided with watertight material ~~in~~ such a way that it the current expansion layer is adequately protected against moisture.

15. (Currently amended) The ~~optoelectronic~~ light-emitting diode chip component according to claim 14,
wherein
watertight material is applied to free areas of the contact layer.

16. (Currently amended) The ~~optoelectronic~~ light-emitting diode chip component according to claim 15,

wherein

watertight material is applied to all the free areas of the contact layer.

17. (Currently amended) The light-emitting diode chip according to claim 14,

wherein

the watertight material is a dielectric that is transparent to ~~an~~ the electromagnetic radiation emitted by the light-emitting diode chip.

18. (Original) The light-emitting diode chip according to claim 17,

wherein

the dielectric comprises one or more of the substances Si_xN_y , SiO , SiO_2 , Al_2O_3 and SiO_xN_y .

19. (Currently amended) The light-emitting diode chip according to claim 14,

wherein

~~the a~~ refractive index of the watertight material is less than the refractive index of the current expansion layer and is adapted so as to significantly minimize ~~the greatest possible extent in particular for a minimization of~~ reflections of the radiation emitted by the light-emitting diode chip at interfaces with respect to the watertight material.

20. (Currently amended) The light-emitting diode chip according to claim 14,

wherein

the current expansion layer has a thickness corresponding to about an integer multiple of half ~~the a~~ wavelength of $[[a]]$ the radiation emitted by the light-emitting diode chip, and the watertight material has a thickness corresponding to about a quarter of said wavelength.

21. (Currently amended) The light-emitting diode chip according to claim 14,

wherein

the thickness of the watertight material ~~lies~~ is in a range of between 50 ~~inclusive~~ and 200 nm, inclusive.

22. (New) The light-emitting diode chip according to claim 4,
wherein
the sheet resistance is less than or equal to 30 Ω/sq .

23. (New) The light-emitting diode chip according to claim 7,
wherein
the cladding layer comprises $\text{Al}_x\text{Ga}_{1-x}\text{As}_y\text{P}_{1-y}$, where $0.1 \leq x \leq 0.5$, and $y = 1$ or where $x = 0$ and $y = 0$.

24. (New) The light-emitting diode chip according to claim 9,
wherein the dopant concentration is between about $1 \cdot 10^{18}$ and $1 \cdot 10^{19}$, inclusive.

25. (New) The light-emitting diode chip according to claim 11,
wherein
the proportion of Al is in a range of between 1% and 3%, inclusive.

26. (New) The light-emitting diode chip according to claim 12,
wherein
the thickness of the current expansion layer is between 450 and 550 nm, inclusive.